

**Advanced Digital Video Converter**

# ***ADVC-HDM1***

**User's Guide**

**Engineered by Canopus Co., Ltd.**

## ■ Cautions Relating to the Use of This Product

This section describes important points to note when using this product.



### Caution

- (1) Unauthorized copying of all or part of this product is prohibited.
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### Notation

- This manual is the ADVC-HDM1 User's Guide.
- This manual describes the ADVC-HDM1 product configuration as of December 2006.
- In the event of any difference between the content of this manual and actual operating procedure, actual operating procedure have precedence.
- For convenience of explanation, some illustrations and screen images may differ from the actual product.



### Warning

#### ■ Health precautions

In extremely rare cases, the stimulus from bright or flashing light emanating from a computer monitor can result in symptoms such as temporary epileptic fits or loss of consciousness. Even if this has never occurred in the past, it is possible that someone may be susceptible to this effect. Anyone who has experienced such symptoms in the past or is a relative of such a person should consult a doctor before using this product.

# CONTENTS

<b>Checks .....</b>	<b>1</b>
<b>Introduction .....</b>	<b>2</b>
Notes regarding usage .....	2
Verifying package contents .....	3
Canopus website .....	3
Online user registration .....	3
<b>About the ADVC-HDM1 .....</b>	<b>4</b>
Features .....	4
<b>Part Names and Functions .....</b>	<b>5</b>
<b>Part Names and Functions .....</b>	<b>6</b>
ADVC-HDM1 Front Panel .....	6
ADVC-HDM1 Rear Panel .....	8
DIP Switches .....	9
<b>ADVC-HDM1 Input and Output .....</b>	<b>10</b>
Connections and Preparations .....	10
Advanced Functions .....	13
<b>Appendix .....</b>	<b>15</b>
<b>Specifications .....</b>	<b>16</b>
ADVC-HDM1 Hardware Specifications .....	16
Connector Pin Diagrams .....	18
Advanced Functions .....	20
<b>List of Commands .....</b>	<b>21</b>
Remote Control Function .....	21
AV/C Command to RS-422 Conversion List .....	23

# Advanced Digital Video Converter

# ***ADVC-HDM1***

## Checks

This chapter describes the items that should be checked before setting up the ADVC-HDM1 and explains product precautions.

- Introduction.
- About the ADVC-HDM1

# 1 Introduction

## 1-1 Notes regarding usage

Regardless of whether negligence occurs during usage, the company assumes no liability, even if there is a claim, for extraordinary, incidental or derivative loss, including the loss of profits, that arise during practical application of this product.

Operation of this product is not guaranteed for any specific use, on any specific platform, nor is operation guaranteed in any specific environment.

Please note the following points when using this product to record the copyrighted works of others (e.g. video and audio recorded in media such as CD, DVD and videogram, or acquired through radio/TV broadcast or Internet transmission).

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- Please note that Canopus is not liable for the copyrighted works or their reproductions, which are created, reproduced or edited by use of this product.

## 1-2 Verifying package contents

Please verify that the following components are included in the ADVC-HDM1 package.

- ☐ ADVC-HDM1
- ☐ AC adapter and AC cable
- ☐ Manual
  - ADVC-HDM1 User's Guide (this one)

## 1-3 Canopus website

The latest company information is announced at our website.

<http://www.canopus.com/>

Visit our site to access to the latest drivers, utilities, product manuals (.pdf format), and FAQs provided there.

## 1-4 Online user registration

Please register your ADVC-HDM1 at the Canopus website:

<http://www.canopus.com/support/>

## 2 About the ADVC-HDM1

### 2-1 Features

- **A compact unit compatible with HDV and HD-SDI conversion**

The ADVC-HDM1 is a converter unit that can encode HD-SDI signals to the HDV standard or can decode and output the HDV standard as HD-SDI signals. It can be stored in a 19-inch half rack mount.

- **Compatible with MPEG2-TS MP@HL encoding**

Eight different bit rate types at a resolution of  $1920 \times 1080$  can be specified. Further, when controlling with advanced AV/C commands, a bit rate from 11 Mbps to 40 Mbps can be specified.

- **Simple to operate**

The front panel of the ADVC-HDM1 includes a button for switching between encode and decode and a switch for setting the time code input. There are no complex operations, enabling anyone to use it.

- **AV/C to RS-422 conversion function**

The ADVC-HDM1 is equipped with a function for outputting an AV/C command to an RS-422 terminal, enabling deck control from the RS-422 terminal of the ADVC-HDM1 when using a computer does not have an RS-422 terminal.

- **Remote control with RS-232C**

Remote control of the ADVC-HDM1 is possible via the RS-232C terminal.

- **Two HD-SDI output systems**

Two systems, a monitor and deck, can be connected to the ADVC-HDM1.

- **Connecting to peripheral devices**

The ADVC-HDM1 can be used as an encoder by connecting it to the HDCS-3000, a high definition (HD) network transmission system made by Canopus. It can be used as an encoder for the live delivery of HD-SDI source with the Medi-aEdge-STB3, a video delivery set-top box made by Canopus.

- **1920 mode**

Enables the encoding and decoding of resolution/frame rate 1920/59.94i images without diminishing the horizontal resolution.

# Advanced Digital Video Converter

# ***ADVC-HDM1***

## Part Names and Functions

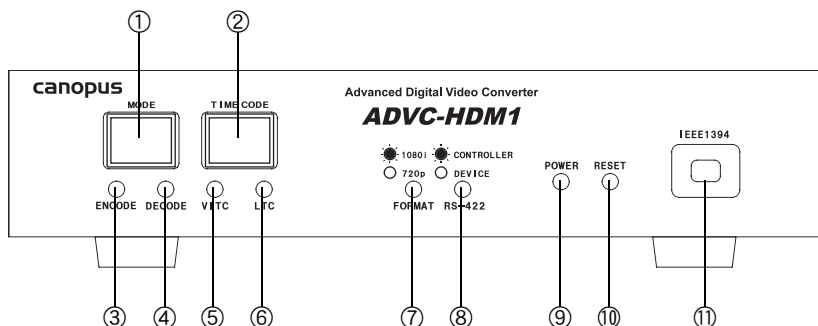
This chapter explains the functions of the ADVC-HDM1 parts.

- Part Names and Functions
- ADVC-HDM1 Input and Output



# 1 Part Names and Functions

## 1-1 ADVC-HDM1 Front Panel



### ① Encode/Decode Switch

Press and hold for more than 1 second to change as follows: [Encode Mode] → [Decode Mode] or [Decode Mode] → [Encode Mode].  
The default setting is [Decode Mode].

### ② Time Code Input Switch

Press and hold for more than 1 second to change as follows: [DVITC Input] → [LTC Input] or [LTC Input] → [DVITC Input] (enabled only during [Encode Mode]).  
The default setting is [DVITC Input].

### ③ Encode Selection LED

On:

Indicates that the encode mode is selected.

Encode selection LED and FORMAT indicator LED flash at the same time:  
Indicates that the ADVC-HDM1 is waiting for a signal input from the HD-SDI.

### ④ Decode Selection LED

On:

Indicates that the decode mode is selected.

Decode selection LED and FORMAT indicator LED flash at the same time:

Indicates that the ADVC-HDM1 is waiting for a stream input from the IEEE1394a port.

#### NOTE

When the [Encode Selection LED] and [Decode Selection LED] flash at the same time, it indicates that the mode is in transition.

### ⑤ VITC Enabled LED

Comes on when DVITC is enabled during encode mode.

### ⑥ LTC Enabled LED

Comes on when LTC is enabled during encode mode.

#### NOTE

The [VITC Enabled LED] and [LTC Enabled LED] come on when decode mode is selected and the stream is HDV. Neither come on if the stream is not HDV.

⑦ **FORMAT Indicator LED**

Indicates the video format being encoded or decoded.

On: Indicates the 1080i format.

Off: Indicates the 720p format.

⑧ **RS-422A Port Indicator LED**

Indicates the selection status of the RS-422A port.

On:

Indicates that the CONTROLLER port is selected.

Off:

Indicates that the DEVICE port is selected.

⑨ **Power Indicator LED**

On: Indicates that the power is on.

Flashing: Indicates an internal error.

⑩ **RESET Button**

Use to reset the ADVC-HDM1. Press and hold for more than 3 seconds to reset.

⑪ **IEEE1394a 4-pin Terminal**

This is an IEEE1394a 4-pin terminal.



**TIP**

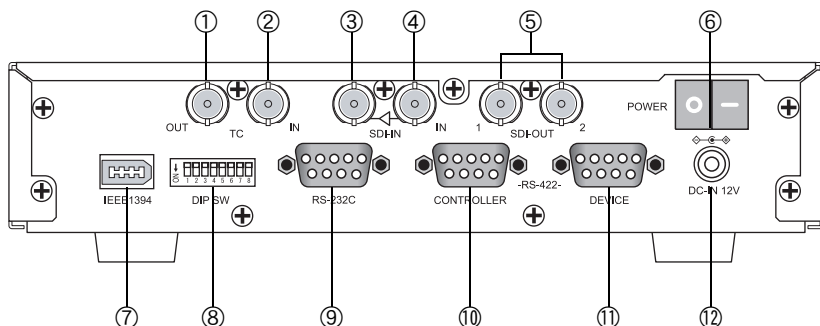
To prevent accidental operation, the settings of the [Encode/Decode Switch] and [Time Code Input Switch] are designed to change only if they are pressed and held for more than 1 second.



**TIP**

Press and hold the [Encode/Decode Switch] and [Time Code Input Switch] at the same time for more than 1 second to change the RS-422A port on the ADVC-HDM1 rear panel to CONTROLLER port or DEVICE port.

## 1-2 ADVC-HDM1 Rear Panel



### ① LTC Output Terminal

This is the time code output (BNC) terminal.

The HDV time code is output during HDV decoding.

### ② LTC Input Terminal

This is the time code input (BNC) terminal. A time code can be input for writing to HDV during HDV encoding.

### ③ ACTIVE THROUGH Terminal

This is the ACTIVE THROUGH terminal. ACTIVE THROUGH is performed for the input signal.

### ④ SDI Input Terminal

This is the HD-SDI input terminal.

### ⑤ SDI Output Terminal

This is the HD-SDI output terminal.

### ⑥ Power Switch

This is the power switch. Use to turn the ADVC-HDM1 ON or OFF.

### ⑦ IEEE1394a 6-pin Terminal

This is an IEEE1394a 6-pin terminal. It does not supply bus power.

### ⑧ DIP Switches

Use to set the operation mode (refer to the next page).

### ⑨ RS-232C Terminal

The remote control terminal.

#### NOTE

The default setting for the encode bit rate via RS-232C terminal remote control is 11 Mbps.

### ⑩ RS-422 (CONTROLLER) Terminal

This is the RS-422 CONTROLLER terminal. Connect as appropriate to the device that you are using.

### ⑪ RS-422 (DEVICE) Terminal

This is the RS-422 DEVICE terminal. Connect as appropriate to the device that you are using.

#### NOTE

Only use one of the following terminals at any one time: RS-232C terminal, RS-422 (CONTROLLER) terminal and RS-422 (DEVICE).

### ⑫ Power Terminal

Use to connect the supplied AC adapter. Never connect to anything other than the supplied AC adapter.

## 1-3 DIP Switches

Use the DIP switches on the rear panel of the ADVC-HDM1 to set the operation mode. The default setting for all the DIP switches is OFF.

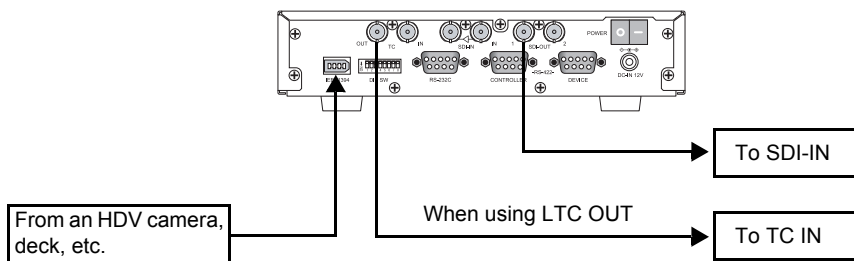
\* Slide down the lever to set the DIP switch to ON.

No.	Name	Function																																				
1	IEEE1394a data rate	Selects the IEEE1394a data rate OFF: S400 ON: S200																																				
2	Start mode	Selects the start mode OFF: Normal operation ON: Firmware update mode																																				
3	Serial port switch	Selects the serial port OFF: RS-422A ON: RS-232C																																				
4	Reserved	Not used																																				
5	MP@HL 1920 encode mode	Operates with MPEG2-TS 1920 × 1080/59.94i during encoding * This setting is ignored if the input video is not 1920 × 1080/59.94i																																				
6, 7, 8	Encode bit rate	Selects the video bit rate for encoding * The bit rate changes are enabled from the next encoding																																				
		<table><tr><th>SW6</th><th>SW7</th><th>SW8</th><th>Operation</th></tr><tr><td>OFF</td><td>OFF</td><td>OFF</td><td>18.3 Mbps (HDV 720p) or 25 Mbps (HDV 1080i) * Outputs a stream compatible with the HDV standard * Encodes with MPEG2-TS and 25 Mbps when SW5 is ON and the input video is 1920 × 1080/59.94i</td></tr><tr><td>OFF</td><td>OFF</td><td>ON</td><td>40 Mbps * MPEG2-TS</td></tr><tr><td>OFF</td><td>ON</td><td>OFF</td><td>30 Mbps * MPEG2-TS</td></tr><tr><td>OFF</td><td>ON</td><td>ON</td><td>20 Mbps * MPEG2-TS</td></tr><tr><td>ON</td><td>OFF</td><td>OFF</td><td>18 Mbps * MPEG2-TS</td></tr><tr><td>ON</td><td>OFF</td><td>ON</td><td>16 Mbps * MPEG2-TS</td></tr><tr><td>ON</td><td>ON</td><td>OFF</td><td>14 Mbps * MPEG2-TS</td></tr><tr><td>ON</td><td>ON</td><td>ON</td><td>11 Mbps * MPEG2-TS * The settings can be changed with the AV/C Canopus Vendor dependent command or via the RS-232C</td></tr></table>	SW6	SW7	SW8	Operation	OFF	OFF	OFF	18.3 Mbps (HDV 720p) or 25 Mbps (HDV 1080i) * Outputs a stream compatible with the HDV standard * Encodes with MPEG2-TS and 25 Mbps when SW5 is ON and the input video is 1920 × 1080/59.94i	OFF	OFF	ON	40 Mbps * MPEG2-TS	OFF	ON	OFF	30 Mbps * MPEG2-TS	OFF	ON	ON	20 Mbps * MPEG2-TS	ON	OFF	OFF	18 Mbps * MPEG2-TS	ON	OFF	ON	16 Mbps * MPEG2-TS	ON	ON	OFF	14 Mbps * MPEG2-TS	ON	ON	ON	11 Mbps * MPEG2-TS * The settings can be changed with the AV/C Canopus Vendor dependent command or via the RS-232C
		SW6	SW7	SW8	Operation																																	
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		OFF	OFF	ON	40 Mbps * MPEG2-TS																																	
		OFF	ON	OFF	30 Mbps * MPEG2-TS																																	
		OFF	ON	ON	20 Mbps * MPEG2-TS																																	
		ON	OFF	OFF	18 Mbps * MPEG2-TS																																	
		ON	OFF	ON	16 Mbps * MPEG2-TS																																	
		ON	ON	OFF	14 Mbps * MPEG2-TS																																	
ON	ON	ON	11 Mbps * MPEG2-TS * The settings can be changed with the AV/C Canopus Vendor dependent command or via the RS-232C																																			

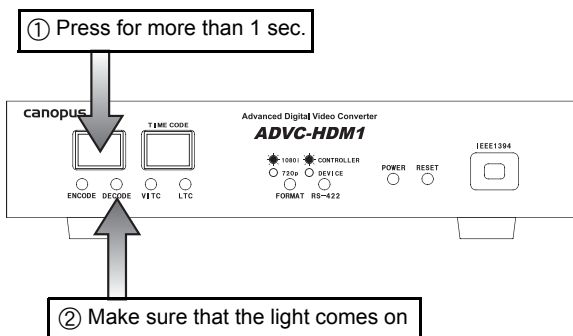
## 2 ADVC-HDM1 Input and Output

### 2-1 Connections and Preparations

#### ■ When using as an HDV to HD-SDI converter



Press the [Encode/Decode Switch] on the front panel of the ADVC-HDM1 to turn on the [Decode Selection LED].



Press the [Encode/Decode Switch] on the front panel of the ADVC-HDM1 to turn on the [Decode Selection LED].



#### TIP

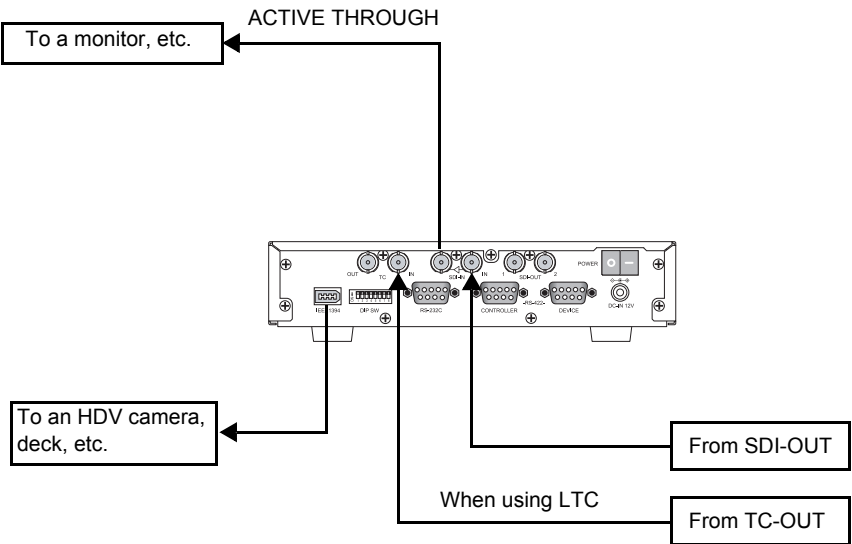
The time code recorded on the HDV is always output as VITC/LTC output.



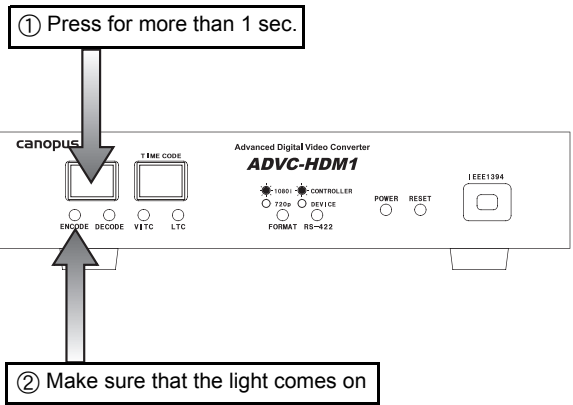
#### TIP

There are two SDI output terminals, enabling two devices to be connected and used at the same time.

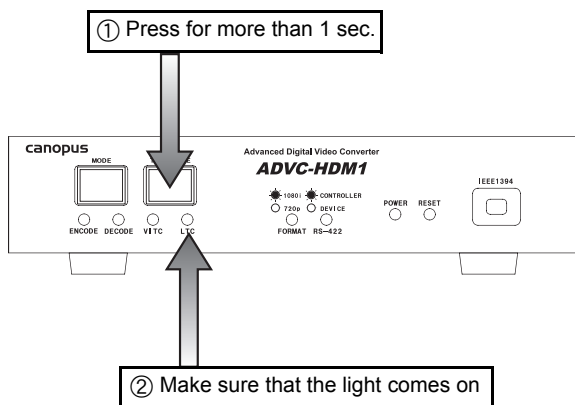
# ■ When using as an HD-SDI to HDV converter



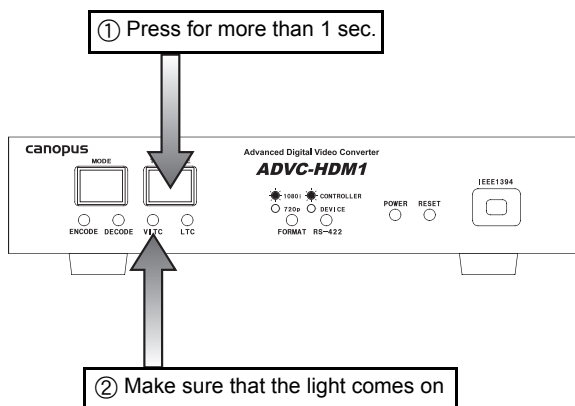
Press the [Encode/Decode Switch] on the front panel of the ADVC-HDM1 to turn on the [Encode Selection LED].



When using LTC, input the time code to TC IN and press the [Time Code Input Switch] on the front panel of the ADVC-HDM1 to turn on the [LTC Enabled LED].



When using VITC, press the [Time Code Input Switch] on the front panel of the ADVC-HDM1 to turn on the [VITC Enabled LED].



## 2-2 Advanced Functions

With the advanced functions described in this section, the encode bit rate can be changed or encoding can be performed with a full resolution of  $1920 \times 1080$ . Please be aware of the following information when using these functions.

	When not using the advanced functions (default)	When using the advanced functions
Output stream	HDV (HD1/HD2)	MPEG2-TS
Time code	Can be used	Cannot be used
Recording to an HDV deck	Can be recorded	Cannot be recorded
Display on an HDV camera	Can be displayed	Cannot be displayed

### ■ Changing the encode bit rate

Change the bit rate with the DIP switches on the rear panel of the ADVC-HDM1. Set the DIP switches to match the bit rate that you want for encoding.

### ■ Encoding with full resolution

When 1080/59.94i is input as the video signal format, encoding is performed at a full horizontal resolution of 1920.

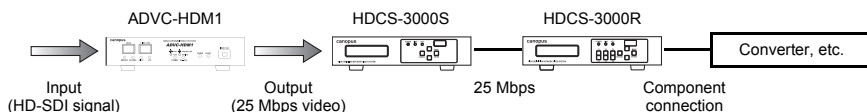
	SW5 OFF	SW5 ON
Resolution	Encodes at $1440 \times 1080$	Encodes at $1920 \times 1080$



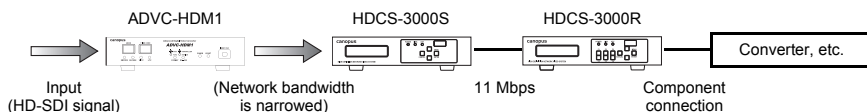
## ■ Benefits of the Advanced Functions

These advanced functions are very effective when used for the network transmission of HD video with devices such as Canopus HDCS-3000S and HDCS-3000R.

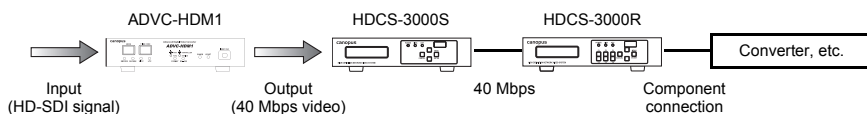
### □ Example: Using HDV



### □ Example: When lowering the bit rate



### □ Example: When raising the bit rate



#### TIP

The actual transmission rate also includes other packet data, so an extra transmission speed of about 5 Mbps must be added to the video bit rate.

# Advanced Digital Video Converter

## ***ADVC-HDM1***

### Appendix

- Specifications
- List of Commands

# 1 Specifications

## 1-1 ADVC-HDM1 Hardware Specifications

Video input	HD-SDI	BNC × 1 (HD-SDI) BNC × 1 (ACTIVE THROUGH compatible with SMPTE 292M)		
Video output	HD-SDI	BNC × 2 (compatible with SMPTE 292M)		
Audio input	HD-SDI	Embedded audio (SMPTE 299M ch1 and ch2 only, ch3 - ch8 are ignored)		
Audio output	HD-SDI	Embedded audio (SMPTE 299M stereo 16-bit/48 kHz)		
Time code	LTC input	BNC × 1	During input: Select DVITC or LTC with the front panel switch During output: Both DVITC and LTC are always output (only enabled during HDV mode)	
	LTC output	BNC × 1		
	DVITC input	Separated from HD-SDI		
	DVITC output	Embedded on HD-SDI		
Stream input and output	IEEE1394	4-pin (front) Compatible with IEC61883-4	Cannot be used at the same time	
		6-pin (rear) Compatible with IEC61883-4		
Control	RS-422A	CONTROLLER × 1	Select to use (cannot be used at the same time), only supports output from AV/C command to RS422A	Cannot be used at the same time
		DEVICE × 1		
	RS-232C	9-pin male × 1	For control	
HDV encode	HD1 720, 59.94p/50p (video: 18.3 Mbps, audio stereo: MPEG1 Audio Layer 2 384 kbps)		Set automatically through the input signal format (720p, 1080i inter-conversion not possible)	
	HD2 1080, 59.94i/50i (video: 25 Mbps, audio stereo: MPEG1 Audio Layer 2 384 kbps)			
HDV decode	HD1 720, 59.94p/50p		Set automatically through the output signal format (720p, 1080i inter-conversion not possible)	
	HD2 1080, 59.94i/50i			

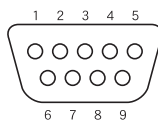
Advanced encode	MP@HL, MP@H14 1080, 59.94i/50i 720, 59.94p/50p 11-40 Mbps		The advanced mode stream for video transmission is an MPEG2 transport stream and is not a multiplex HDV format (LTC/DV/ITC input/output function cannot be used)
Advanced decode	MP@HL, MP@H14 1080, 59.94i/50i 720, 59.94p/50p		Check in advance with the actual device which streams are available for the advanced mode decode for video transmission.
Power voltage	AC adapter	AC 100 V - 240 V (50 Hz/60 Hz) Output: DC 12 V 3 A	
	Unit	DC12V 1A	
Others	Dimensions	215.5 (W) × 246.4 (D) × 44.0 (H) mm	
	Weight	Approx. 1.5 kg	
	Operating temperature range	5 - 40°C	No condensation

## 1-2 Connector Pin Diagrams

### ■ RS-232C port

DSUB-9

Pin#	Signal Name
1	(open)
2	RD
3	TD
4	DTR <sup>*1</sup>
5	GND
6	DSR <sup>*1</sup>
7	RTS <sup>*2</sup>
8	CTS <sup>*2</sup>
9	(open)



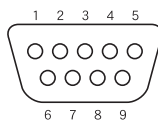
<sup>\*1</sup> Internal short

<sup>\*2</sup> Internal short

### ■ RS-422 CONTROLLER port

DSUB-9

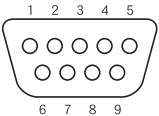
Pin#	Signal Name
1	GND
2	RD-
3	TD+
4	GND
5	(open)
6	GND
7	RD+
8	TD-
9	GND



■ RS-422 DEVICE port

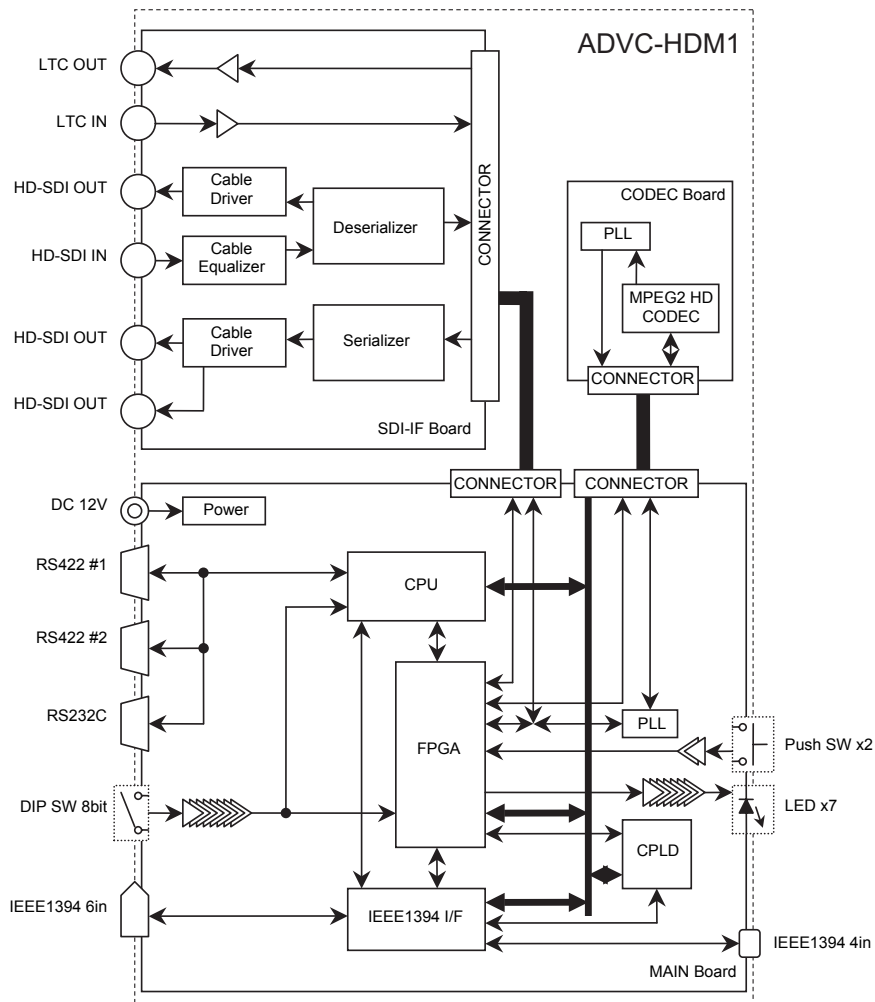
DSUB-9

Pin#	Signal Name
1	GND
2	TD-
3	RD+
4	GND
5	(open)
6	GND
7	TD+
8	RD-
9	GND



## 1-3 Advanced Functions

Block Diagram of ADVC-HDM1



## 2 List of Commands

### 2-1 Remote Control Function

#### ■ Serial Interface

RS-232C, 9600 bps, 8-bit, parity none, stop bit = 1 bit

#### ■ Command List

PL	Start playback if the current mode is not playback (encode) Format: "PL" Status report: Completion message ("R")
RC	Start record if the current mode is not record (decode) Format: "RC" Status report: Completion message ("R")
SO	If the current mode is playback (encode), stop playback and start record Format: "SO" Status report: Completion message ("R")
?P	Check the current operation mode Format: "?P" Status report: "P02": ADV-C-HDM1 starting or mode in transition "P04": Playback (encode) "P14": Record (decode)
TC	Change the input time code setting for encoding to VITC or LTC Format:            "(Integer) TC" "1TC" VITC "2TC" LTC Status report: Completion message ("R") E06: Command argument error (integer is neither 1 nor 2) When the input time code is changed during decode operation, the changed setting is enabled from the next encode operation.
?T	Check the input time code setting of the current encoding Format: "?T" Status report: "1": VITC "2": LTC



?I	<p>Check whether or not there is a current HD-SDI input</p> <p>Format: "?I"</p> <p>Status report: "1": There is an input "0": There is no input</p>
VB	<p>Specify the video bit rate for encoding</p> <p>Format: "(Integer) VB"</p> <p>Specify the bit rate value in units of 400 bps</p> <p>Status report: Completion message ("R") E06: Command argument error (when a bit rate is not specified)</p> <p>The video bit rate specified with this command is set during encoding when it is possible to specify the video bit rate with the DIP switch settings (SW6=SW7=SW8=ON). When the bit rate was set during encode operation, encoding is restarted if SW6=SW7=SW8=ON. When the bit rate was set during decode operation, the set value is enabled from the next encode operation.</p>
?B	<p>Check the video bit rate that was specified during encoding</p> <p>Format: "?B"</p> <p>Status report: "(Bit rate value in units of 400 bps)"</p> <p>Returns the bit rate value that is used when it is possible to specify the video bit rate with the DIP switch settings (SW6=ON SW7=ON SW8=ON).</p>

## 2-2 AV/C Command to RS-422 Conversion List

### ■ Command List

AV/C Command	Deck Operation
Stop	Stop
X1	Play
AVC_RECORD_RECORD	Record
RECORD PAUSE	Pause
FAST FORWARD	Fast forward
HIGH SPEED REWIND	Rewind
REWIND	Rewind
EJECT	Eject
FORWARD PAUSE	Pause
NEXT FRAME	Advance by 1 frame
SLOWEST FORWARD	1/20 speed
SLOW FORWARD 6	1/10 speed
SLOW FORWARD 5	1/7 speed
SLOW FORWARD 4	1/6 speed
SLOW FORWARD 3	1/5 speed
SLOW FORWARD 2	1/4 speed
SLOW FORWARD 1	1/2 speed
1×	×1 speed
FAST FORWARD 1	×2 speed
FAST FORWARD 2	×3 speed
FAST FORWARD 3	×4 speed
FAST FORWARD 4	×5 speed
FAST FORWARD 5	×10 speed
FAST FORWARD 6	×20 speed
FASTEST FORWARD	×20 speed
REVERSE PAUSE	Pause
PREVIOUS FRAME	Reverse by 1 frame
SLOWEST REVERSE	1/20 speed
SLOW REVERSE 6	1/10 speed
SLOW REVERSE 5	1/7 speed
SLOW REVERSE 4	1/6 speed

SLOW REVERSE 3	1/5 speed
SLOW REVERSE 2	1/4 speed
SLOW REVERSE 1	1/2 speed
X1 REVERSE	×1 speed
FAST REVERSE 1	×2 speed
FAST REVERSE 2	×3 speed
FAST REVERSE 3	×4 speed
FAST REVERSE 4	×5 speed
FAST REVERSE 5	×10 speed
FAST REVERSE 6	×20 speed
FASTEST REVERSE	×20 speed

\* Sony 9-pin control protocol is used for the output deck control commands.

\* The details for the AV/C commands are the same as the “Playback Mode” item in the “IEEE1394 Interface Implementation Guideline”.

## ■ Changing the Video Bit Rate

The following methods can be used for changing the video bit rate setting when using AV/C commands.

### (1) Checking the Video Bit Rate Setting Value

Input

```
ctype = STATUS(1)
```

```
operand[5] = 0x01
```

```
operand[6] = 0xff
```

```
operand[7] = 0xff
```

```
operand[8] = 0xff
```

```
operand[9] = 0xff
```

Output

```
rcode = STABLE(0x0c)
```

status (operand[4]) is one of the following:

```
0x00 succeeded
```

```
0x01 failed
```

```
0x02 invalid parameter
```

If successful, video bitrate in units of 400 bps are returned as follows:

operand[6] = video bitrate in units of 400 bps (bit 0 – bit 7)

operand[7] = video bitrate in units of 400 bps (bit 8 – bit 15)

operand[8] = video bitrate in units of 400 bps (bit 16 – bit 23)

operand[9] = video bitrate in units of 400 bps (bit 24 – bit 31)

## (2) Video Bit Rate Setting

Input

ctype = CONTROL(0)

operand[5] = 0x02

operand[6] = video bitrate in units of 400 bps (bit 0 – bit 7)

operand[7] = video bitrate in units of 400 bps (bit 8 – bit 15)

operand[8] = video bitrate in units of 400 bps (bit 16 – bit 23)

operand[9] = video bitrate in units of 400 bps (bit 24 – bit 31)

Output

rcode = ACCEPTED(0x09)

status (operand[4]) is one of the following:

0x00 succeeded

0x01 failed

0x02 invalid parameter